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Policy maker-Student relationships: evidence
From The Armenian Higher Education system

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Abstract

This work discusses a policy maker-student relation taking into account educational standards, asymmetric information and incentives for students to study well. The problems discussed are the characteristics of developing countries.

To define educational standards is not enough for an efficient educational system. Supervision is desired to minimize moral hazard and not to loose the best students. Especially in developing countries where there is no flexible loan market, the state financing of students who are studying well could be an appropriate incentive for students to study with more enthusiasm and do their best to keep their position in the University.

Key words: Reduction in tuition fee, student's Excellency, supervision of the Educational process, efficient educational system

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1. Introduction

Education is an important factor that plays an important part in forming a civilized community and developing the economy. The strategy of education is of utmost importance for each country and modern human being.

The benefits of higher education, both private and public, can be divided into pecuniary, relating to or consisting of money, and non-pecuniary benefits. Social returns are the net benefits that reach society from both private and public investments in higher education (Michael J. Rizzo, (2004))

An education policy maker, be it private or public, considers several aspects before planning and implementing the strategy of the education.

In modern society young people want to be educated, as they anticipate the high returns from schooling after graduating from University. Some of them study well, some of them not so well while others even drop out of their studying. The reasons for different levels of Excellency are different. In regard to labour market, employers are eager to have a qualified labour force because highly productive employees shift the production function.

Overall, the policy maker wants to have a number of good students, students in turn want to be educated and employers want to have educated employees.

1.1 What questions do this work cover?

1. How to find the balanced higher education system which is desirable almost for all members of society?
2. How to know if the Educational system is efficient for policy maker and student?
In this work I will represent the link between the policy maker and the student and try to answer the questions written above. For this purpose I will investigate the aims of a policy maker and a student. I will mention the theoretical and empirical discussions around this topic concerning the relationships between policy maker and student, student and policy maker.

As a real life example, the case of High Educational System of Armenia will be discussed trying to compare the pros and cons of the past and present educational policy. Students' incentives will be the key factor during the discussion of this topic.

There are two important aspects of efficient educational system which are standards and incentives for students.

I will try to find out if the efficient educational system is the system where the policy maker and students "walk hand in hand", that is to say when in the presence of the optimal educational standard, not too high, and not too low, there are incentives for a student to study hard and become a good specialist in the chosen area.

Educational policy and standards have major role in the studying process of students.

This work is concerned mainly to the supervision of the educational process.

1.2 The structure of the work

The works of several researchers is mentioned shortly in the second section. Principal Agent Theory will help to discuss the strategic steps optimal for policy maker and student. Utility functions suggested by many authors will be discussed. More detailed discussion of Michael Rothschild's & Lawrence J. White's (1995) article 'The Analytics of the Pricing of Higher Education and Other Services in Which the Customers Are Inputs' will be introduced.

The third section is devoted to the discussion of Armenian higher educational institutions. In the forth section the principal agent and game theoretical approaches are presented for the High Education system of Armenia. In the fifth section the data analysis is represented.

The data obtained from the Ministry of Education and Sciences of Armenia contain Excellency marks of students for two academic years. Via data analysing I will check if the chosen part of students which are allowed to study without tuition fee are studying well during their university years and able to compensate the given discounts in their tuition fees by studying well.

Concluding remarks are given in the sixth section.

2. Related literatures

The definition of the educational policy can be given as the implementation and the supervision of different educational standards.

When the policy maker is a state it strives to get 'good' students for society. When the owner of the university is an individual, he or she again strives to get 'good' students. Because private educational institution in some sense is a market where teachers sell their knowledge and the owner gets profit from the tuition fee paid by students. That is why the high reputation of its organization is so important for future existence and development of its institute. For this purpose in higher educational system policy makers implement some kind of price discrimination; they try to compensate a part of the tuition fee of a student in order to attract clever students.

There are some controversies in the educational market: on the one hand universities try to attract the best students by subsidizing and giving scholarships and grants to their students, on the other hand they are non profit organizations and cannot exist for a long time when expenses are bigger than profits.

Not going deeper into controversies and making some assumptions, Michael Rothschild & Lawrence J. White (1995) wrote an article 'The Analytics of the Pricing of Higher Education and Other Services in Which the Customers Are Inputs'. The model discussed in that work is simple but at the same time fundamental, that is why models, referring to Education field are frequently linked to that work. They discuss the educational process in 'production and input-output' framework, where human capital is considered to be output and students are considered to be inputs.

Educational technology is represented by G^t convex functions

1. $Y^t = G^t (s_1^t, \ldots, s_N^t; H_1^t, \ldots, H_N^t)$, t=1, \ldots, T,

Where Y^t is the amount of general resources used in technology t,

s_n^t is the number of students of type n attending university t

H_n^t is the aggregate amount of human capital of type n produced by university t.

Human capital is an output and students are inputs as was mentioned above.

The optimization problem is given minimum costs to get maximum output.

It follows from the convexity of the G^t and from the standard assumptions about the production technology that the second order conditions with respect to human capital and student are:

$$\frac{\partial G^t}{\partial H^t_n} \geq 0 \qquad\qquad \frac{\partial G^t}{\partial s^t_n} > < 0$$

It was assumed that the universities will operate in the region where $\frac{\partial G^t}{\partial s^t_n} < 0$

For illustration Cobb- Douglas' technology was used, which exhibits constant returns to scale:

$Y = s_1^{\beta_1}, \ldots, s_N^{\beta_N} H_1^{\alpha_1}, \ldots, H_N^{\alpha_N}$, where $\beta_n \leq 0, \alpha_n \geq 0, s_n > 0$

The **social allocation problem** is presented by the following formula

2. Max $\sum_{t=1}^{T} \sum_{n=1}^{N} H^t_n - \sum_{t=1}^{T} Y^t$

Subject to

(2.1) $Y^t = G^t (s_1^t, \ldots, s_N^t; H_1^t, \ldots, H_N^t)$, t=1 , . . . , T,

and

(2.2) $\sum_{t=1}^{T} s^t_n = Q_n, n = 1, \ldots N.$

Q_n is the quantity of the n type students.

$Y^t \geq 0, t = 1, \ldots T$

$H^t_n \geq 0, n = 1, \ldots N; t = 1, \ldots T.$

$s^t_n \geq 0, n = 1, \ldots T$

The First order conditions are

$-\frac{\partial G^t}{\partial s^t_n} = w_n,$ if $s^t_n > 0,$ where w_n are Langrangean multipliers for the (2.2) constraint,

This condition shows that the optimal allocation of students is such that the marginal substitution of a student of type n with respect to general input is the same at all universities that students of type n attend.

The next condition states that at each University the production of each type of human capital should be extended to the point at which its marginal cost is equal to 1.

$$\frac{\partial G^t}{\partial H^t_n} = 1, \text{ if } H^t_n > 0$$

In other words the equation shows that the marginal cost of producing an additional unit of human capital should equal its marginal product.

Rothschild & White (1995) showed that equilibrium prices charged by a competitive industry of profit seeking universities satisfy the conditions for an optimal allocation.

They assumed that each student of type n receives $\dfrac{H^t_n}{s^t_n}$ of human capital.

The profit **of the University t** will be

$$3. \pi^t = \sum_n p^t_n s^t_n - Y^t \quad \text{Where } p^t_n \text{ is the tuition fee charged from the student of type n.}$$

When the optimal allocation is denoted $\hat{H}^t_n, \hat{s}^t_n$, the condition below will decentralize that allocation. To be more precise, the University t has to pay $\hat{w}_n$ to the n type student in order to attract him. Hence Pareto optimality does not hold in favour of the university.

$$p^t_n = \frac{\hat{H}^t_n}{\hat{s}^t_n} - \hat{w}_n \quad \text{Where } \hat{w}_n \text{ is the net gain of a student of type n.}$$

Each university's problem is to choose $H^t_1, ..., H^t_N$ so as to minimize $G^t (s_1{}^t, \ldots, s_N{}^t ; H_1{}^t, \ldots, H_N{}^t)$ subject to $H^t_n \geq \hat{H}^t_n, n = 1, ..., N$

Thus, the so called 'student input market' is compatible and Universities have to pay such kind of ω_n wages to students of type n equal or bigger than their opportunity cost to attract the best, productive 'student input'. The Universities organize production processes and after getting the human capital they sell that human capital to the students who were acting as inputs at the beginning. After which, the human capital is being sold back to those students.

To conclude, this model allows charging different tuition fees from the different students and the students' net gain of different types will be different and dependent on their marginal productivity. Rothschild & White (1995) as limitations of the model mentioned that

1. Although it was assumed that Universities are profit maximisers, in practice universities do not cover their expenses through tuitions and it is hard to find out what they are maximizing or who is maximizing.

2. Capital market imperfections in practice put students into inconvenience to pay for education.

3. Although in the model it was assumed that universities were fully informed about students types and students were informed about universities types, in real life information asymmetries in the education field are faced.

Winston(1999) has discussed several aspects of Higher education. He wrote that in higher education the universities want to know whom they sell human capital and students care about from whom they buy human capital. In this case microeconomic scenario, where buyers are anonymous and sellers do not want to know who the buyers and also where the presence of some type of customers does not influence on the other customers, is not compatible. In addition to the model by Rothschild & White, particularly he suggested to take peer quality as an input in production function. Peer quality cannot be bought by anyone besides its customers-students. Schools control the quality of students by paying subsidies to the best students. He concluded that the greater the donative resources, the more schools control the student quality.

One interesting result he got by using the data of Winston and Yen, 1995, updated with 1994-95 data, taking the information about the student subsidy at most of the accredited, degree granting colleges and universities in the U.S. The data included 2739 institutions both private and public. He calculated and showed that the student at the bottom university from the top deciles pays a higher net price (education tuition fee - subsidy) than the student at the top university in U. S.

Principal agent theory has its applications in the education sphere as well. Paola and Scoppa (2007) examined the relationship between student effort and educational standards in the principal agent framework. In this work they analyse the determinants of students' efforts and the optimal educational standards which allow maximizing social welfare functions.

The sequential game is arranged by the following order: the policy maker sets the standard and in the second stage, students decide how hard to work at school. As the policy maker is a Benthamite[1] policy maker

The **social welfare function** is the following

$$1.\, SWF = \int_{\breve{a}}^{\bar{a}} \left[\pi e - c(e, a_i) g(a) da\right] \text{ Subject to } e^*_i = \left[\frac{B(\bar{s})(1-\beta)}{2z} + \omega\pi\beta\right]\frac{a_i}{\gamma}$$

Where is was assumed that there is a continuum of types of individuals, parameterized by a, a $\in [\breve{a}, \hat{a}]$ and a is uniformly distributed by density function g(a)=1/$((\breve{a} - \hat{a}))$

The student's performance s is measured with error s=e-ε, ε is uniformly distributed with f(ε)=1/2z density function in the range $[-z, +z]$

$c(e, a_i) = \frac{\gamma e^2}{2a_i}$ is the cost function, where a_i are individuals innate abilities and γ is a

parameter measuring the disutility of effort and e is for effort

Diploma bonus is denoted by $B(\bar{s})$

Productivity of skills is denoted by πe and $0 < \omega \leq 1$ is the fraction of that productivity

$\beta(0 \leq \beta \leq 1)$ is the weight of effective skills to the attainment of a formal qualification.

The return to schooling of the individual is represented by the following formula,

$2.\, W = \Pr(e - \varepsilon \geq \bar{s})B(\bar{s})(1-\beta) + \omega\pi e_i\beta$, where $\Pr(e - \varepsilon \geq \bar{s})$ is the probability of obtaining the credential, when invested effort by the student is equal to or bigger than the optimal educational standard.

The utility function of the student is presented by

3. $U_i = W_i - c(e, a_i)$

After substituting the probabilistic function of returns to schooling into the utility function the 3 formula will be

$$U_i = \frac{(e_i - \bar{s} + z)}{2z}B(\bar{s})(1-\beta) + \omega\pi e_i\beta - \frac{\gamma e^2}{2a_i}$$

Utility maximizing student will find the optimal effort. By differentiating the utility function with respect to efforts, the optimal one will be found.

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[1] Benthamite policy maker sums the utilities of individuals

$$4.\ e_i^\circ = \left[\frac{B(\bar{s})(1-\beta)}{2z} + \omega\pi\beta \right] \frac{\alpha_i}{\gamma}$$

Formula 4 shows that optimal effort e_i° is increasing parallel to wage premium, diploma bonus $B(\bar{s})$, and ability α_i and is decreasing in γ.

Andersson and Konrad (2003) presented the following **two period utility function** of an individual

$$1.\ U = -c(e) + e + (1-p(e))u(x_L) + p(e)u(x_H)$$

p(e) is the individuals probability of becoming highly productive which is monotonic and increasing function

x_L is the individual's net income of the individual if the latter end up with low productivity

x_H is the individual's net income of the individual if the latter end up with high productivity

If there is no private insurance, the FOC of the utility function will be

$$C'(e) - 1 = p'(e)\big[u(m_H) - u(m_L)\big]$$

Where m_H is the individual's earnings if he or she has high productivity

$\qquad m_H$ is the individual's earnings if he or she has low productivity

The different tuitions charged from the students can be treated as the Third degree price discrimination. In general when different buyers are charged different prices for the same unit of good it is called third degree price discrimination. Each buyer pays constant price for each unit of the good. Varian (1992) discusses the consequences of the third degree price discrimination on welfare functions. He showed that welfare function should be increased in order to increase the total output. He stated that if a new market will be opened as the consequence of price discrimination than Pareto improving welfare will be exhibited.

Adachi (2003) showed that social welfare can be improved even though the total output is the same. It was shown that in the presence of consumption externalities the sum of consumers' surpluses could also increase. When discussing the software market, it was noticed that there are positive externalities: the more the students use software the more benefit they get.

2.1 Conclusion of the related literature

To conclude by mentioning the articles in this section it was seen that in education sphere the policy maker acting as the seller tries to sell human capital to the buyer who is a student in this case. Trying to maximize his profit the policy maker makes some discounts for some students to sell more goods, that is to say to attract more customers. In recent cases third degree price discrimination is revealed.

In the framework of production function, it can be said that the policy maker pays higher price for them to get high qualified inputs and to have an efficient production. The last article discussed for the software market provides evidence for the education market as well. In my opinion when there are discounts in tuition fee for some students, the consequence is that those students have incentives to study and the others have incentives to study hard to be included in the first group, when those tuition fee discounts hold.

Although a famous economics statement which is: 'the sellers and buyer are anonymous' does not hold in education system where the universities and students care about the identity of each other, and via profit maximization and with the help of competition, an efficient field is being created for both parts. Now turning to the utility of the student, it was seen that when acting the student tries to maximize his utility function by choosing the 'appropriate' university for getting a 'good' education via an efficient price which will maximize his utility function. That is why when making educational policy the policy maker takes into account the alternative cost of the student. The utility function of a student consists of the returns to schooling minus the costs of education. If the labour market rewards the student properly the latter will put much effort in getting High education.

In the next section the Armenian High Education system will be discussed.

3. Armenian Higher Education System Before 2005

Armenia is one of the 15 republics of the former Soviet Union. Armenia remains the most literate among the republics of the former Soviet Union. In 1991 Armenia got independence and got sovereignty. After the collapse of the central planning the country had a destroyed economy, as it is known that the members of the former Soviet Union were connected to each other with thousands of economical threads. Each country had been specialized in certain field and was a provider of the special raw materials for the central planned industry.

This transitional period affected the Education of the Republic of Armenia. The Armenian people gained a high level of education during the period of Soviet Union. People had equal right to study and access to study. The attendance to school was compulsory in order to get basic education. The various levels of education were free and had centralized financing. The quality of education was high as was reported by the international and national surveys.

The educational system of Armenia consists of preschool institutions (kindergartens), schools (primary and secondary), vocational colleges, higher education establishments (universities), institutes with branches and academies and post-graduate institutes (scientific institutes).

Since 1991, the transitional period of the economy has affected on the educational system. Although the programmes and materials of previous years were kept, it was a new period for the development of educational system in Armenia.
High Education Institutes in Armenia have been divided into State and non State Institutes.

In comparison to the other educational systems of the world, the Armenia private high educational system not always means a good quality of learning. The majority of people try to enter the state higher educational establishments, moreover, in labour market diplomas or credentials of private higher educational institutions are not so widely accepted as state institutes credentials. The graduates   of the non state Universities are given an opportunity to participate in final exams for graduating and getting diploma of state sample[2].

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[2] Acknowledged by state

For entering higher educational establishment the applicants had to study hard and even to take extra lessons with the help of tutors. There are two aspects of this issue; on the one hand it can be seen as the weakness of schools, because they can not prepare their pupils to take entering exams easily. On the other hand it can be a proof of the high educational standard for entering high educational establishments.

Universities have 3 three level system. First level is a bachelor degree, which lasts 4 years, after it students can continue their study for 2 years and get a master degree.

During these 2 years the students get broader knowledge in the chosen area.

The Specialist Diploma is awarded to those having completed secondary education and followed five years of higher education.

The third level is PhD level, which requires 2 or 3 years studying.

To enter the University applicants participate in centralized exams since 1991.The whole applicants of all Universities take the same exams of math, foreign language, native language and other subjects. The number of exams they should take depends on chosen profession and the requirements for that particular speciality.

After taking exams, applicants take part in competition. Some of them are allowed to study free paying 'no tuition fee' and the others are allowed to study with tuition fee. Naturally the rest of students are being missed because of low grades. After entering University students study as was decided beforehand, as a result of competition among them one part of them study in a 'no tuition fee' system, and others study in a 'tuition fee' system. The part which study in a 'no tuition fee' system each month gets scholarship from state equal to 100 SEK and the students who study excellently get 120 SEK. As for the students studying in a 'tuition fee' system, with only excellent marks they paid only half of the tuition fee.

3.1 Armenian Higher Educational System After 2005

As mentioned above there are private and state higher educational institutions in Armenia. 20 state (where 4 are established by intergovernmental agreements) with their 14 branches[3] (usually located in other cities than capital). There are 33 private universities accredited by the state and the next 39 without accreditation (total 72). State Universities have 61.000 and private Universities have 15.000 students accordingly (National tempus, 2007). In 2006, public institutions were educating 52,100 students, whereas 21600 students were being educated in private institutions. (Statistical Yearbook of Armenia, 2006) Non-state universities or private universities are mainly based on tuition fees. In State universities there are state ordered and fee-paying students. About 60-70% of students in State Universities are tuition fee paying. Each year the government of RA defines and proves the number of the needed specialities.

According to Constitution of Republic of Armenia, adopted in 1995, all citizens of Republic of Armenia have the right to get education; the secondary education in public schools is free; and every citizen has the right to get higher or other professional education on a competitive basis.

Since 2006 there have been some changes. After the end of the first academic year the grades of students are taken into account to publish the names of students who will study in a 'no tuition fee' system. It means the students easily give their place to their class mates if they do not study well. The next reform in High Educational System (HES) of Armenia is the integration of European standards. Old grading system changed into ECTC system. The acceptance of the credit system in High Education of Armenia was in 2006-2007 academic year. Students should gather credits in order to be transferred to the other level of studying and of course for getting the final diploma.

The main activities included in the Law on Higher and Postgraduate Professional Education and approved in December 2004 are the followings (national tempus 2007)

1. Developing quality assurance mechanism;

2. Establishing a platform for recognition of Armenian HE degrees and cycles by European area for HE, facilitate the mutual recognition of qualifications;

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[3] Here by saying Branch it should be understand the same university with the same departments in the other region than Yerevan, capital of Armenia

3. Developing standards in Higher Education aligning to international ones;

4. Promoting a system of credits (such as ECTS);

5. Setting up a national ECTS office to develop guidelines on credit transfer system;

6. Setting up a national office for foreign degrees recognition;

7. Promoting Armenian involvement into ENIC and NARIC network and implementing Lisbon convention statements;

8. Harmonizing Armenian Diploma Supplement to European standards;

9. Developing students' scholarship system;

10. Establishing links between HE sector and labour market;

11. Improving efficiency of HE sector;

12. Setting up career centres at universities, etc.

Armenia joined the Bologna Process in May 2005. RA recognized the importance of the establishment of the European Higher Education area by 2010 where staff and students can move easily and can have fair recognition of their qualifications. Co-operation between national educational system and between higher educational institutions in Europe will facilitate the process of reformation and tighten Armenian higher educational system. (Sargsyan, Budaghyan 2007)

To sum up, the state recently has tried to be integrated in the worldwide market of education to accept and implement educational standards. The educational system is still very important issue for high authorities and they are eager to have strong educational system.

3.2 Difficulties in the Educational system of Armenia

In high educational system there are some obstacles, difficulties. These difficulties are characteristics of every developing country. For instance there is a corruption in educational system of Armenia. The next problem is weak system of financing the students and absence of a flexible loan market. Mainly students get finance from their parents' earnings. Unfortunately the unemployment rate of the population is high.

Although the ratio of unemployed people in total unemployment who have high education is not so high, after getting educated it is difficult to find a job in labour market. There is no flexible connection, links between labour market and Universities, as was for instance during the Soviet Union period, when the next day after graduating student had work according to his speciality.

The other problem is the slow modernization of the textbooks, materials and programmes and sometimes not trained lecturers who are not ready for serving these new programmes.

Another problem is the low salaries of staff, small amount of scholarships for students, compared with Soviet Union period, when for instance the monthly scholarship was enough to strive.

To conclude there are a lot of challenges remained from the central planning economy and renewed problems, which are peculiar to the transitional economy.
In my point of view these later changes in High Education System have some advantages, now policy maker and student relationships will be discussed in the framework of principal agent theory.

4. Principal-Agent approach

In the Education sphere, the principal is a policy maker, the agent is an academic (Ghosh and Rodgers (1999)) or a student.

Taking into account the main ideas of the principal agent theory (Varian (1992), it can be said that in this case principal wants to induce maximal efforts from student in order to get much profit in the future. The principal in the Higher education system of Armenia will be act as a monopolist, because it offers a qualified education compared with private High Educational Institution (HEI). Policy maker wants to maximize B-X, where B is a future benefit from the educated students, and X is the tuition fee paid by principal.

It is assumed that the Policy maker (the state) will benefit from the future earnings got of the student. The student will pay taxes and society and state will benefit not only from the taxation but also from the professional investments and skills of the student. This thus gives rise to a type of Social welfare function.

max B-X_b
Such that X_b-C_b>=ū participation constraint of the student
X_b-C_b>X_a-C_a incentive constraint of the student,

Where C^4_a and C_b are participation costs for the agent, when doing a and b actions accordingly. The agent will find an action b strictly preferable to a action, as in this particular case, studying in the State University is much more preferable than studying in the private University. As was mentioned above the State universities in Armenia are higher ranked compared to the Private Universities. Even though the tuition fees of the private Universities are less than the tuition fees of the state Universities the returns of schooling from graduating state university is usually accepted to be higher.

Naturally the principle wants X be as small as possible, that is why participation constraint will bind that X=ū+ C_b. Hence the objective function of the principal is:

$$\Rightarrow \quad \textbf{max B- ū- } C_b$$

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[4] Here it is assumed, that participation costs are tuition fees from state and private universities.

In the student's point of view C_b is equal to 0, when the policy maker agrees to pay the tuition fee instead of the agent (student). If the incentive constraint had included the returns to schooling, we could refer to C_a, as an alternative cost to work in the labour market instead of studying. The agent is paid X tuition fee to implement his b action and to provide the principal with output B, otherwise the principal will punish the agent and find another student, more capable to bring B profit.

X_a is a profit from studying in a private alternative University.

Thus, in the third section we have discussed two systems, in the first one, where after entering University till graduation the status of students were not change, has its shortcomings: Moral Hazard was big for policy maker. Only the entering exams are not enough to conclude, to be sure that chosen students will do their best to become good specialists in the particular sphere.

Students, entering University and studying in a 'no tuition fee' system were confident that their place will remain no matter how they will study. Naturally, clever students were chosen as a result of competence, but there were some weak places in that policy. For instance, a student could be lucky and the day of examination got very familiar topic or problem to solve, which he solved before for a few times. Other example could be, when a student has high abilities to study well, but because of excitement, he could not show himself, his abilities maximally[5].

 Thus the state could frequently experience adverse selection: that is to say not financing best or more capable students' studying.

Now the new rule lowers moral hazard, as the policy maker follows the students, agents, how they study during their academic years. Policy maker in its turn wants to be fair and finance best students who are eager to study well and be future sophisticated employees for future national economy.

It may be the case that because Armenia is a developing country, financing is an important aspect for students. There is a real competition among them; everyone wants to get rid of the tuition fee.

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[5] No retake exams are allowed during the entering exams

The game theoretical approach will now be presented, which describes State-Students strategies and gains from these strategies.

4.1 Game theoretical approach

4.1.1 Setup of the game

Below the policy maker-student relations will be discussed in the case of Armenian Higher education system in a game theoretical framework. Two policy types will be discussed separately and compared with each other.
There are 2 cases:

Case1: the policy maker uses the old approach. Students after having taken the centralized exams on the basis of competition study in the *'tuition fee'* system or the *'no tuition fee'* system. The Policy maker does not care how well the students study. No matter how many excellent or satisfactory grades the student has, if he or she has been accepted in the '*no tuition fee'* system during his/her academic year no tuition fee will be required. The students studying in the *'tuition fee'* system will pay half of the tuition if they study excellently; otherwise they pay the full tuition fee.

Case2: the policy maker uses the new approach. Students after having taken the centralized exams on the basis of competition are chosen to study either in the *'tuition fee'* system or in the *'no tuition* fee' system. The Policy maker cares about the Excellency of the students. After the academic year students who have excellent marks on the basis of competition will be allowed to study in the *'no tuition fee'* system.

Thus, the main difference between these two cases is that in the second case the students further paying tuition fee depends on his/ her Excellency marks no matter in what system the student has been accepted either in the *'no tuition fee'* system or *'tuition fee'* system. In other words the students with higher grades will get rid of the tuition fee while the other students comparatively with lower grades must pay the tuition fee.
The Players of this game is the policy maker and the student.

Payoffs are described by the variables X, Z, B where

X is a tuition fee. When a student studies well the policy maker pays that tuition fee instead of the student so it becomes a cost for him. X is a random variable from 150.000 Armenian Dram to 450.000 Armenian dram or in Swedish kronas it will be, according to the exchange rate of the Armenian Central bank, by 2009-02-02 1SEK=36.34, so 150.000 AMD=4128 SEK and 450.000 AMD=12383 SEK annually.

Z is a yearly scholarship paid to student, when he studies with excellent marks. Z =12* 6000AMD which is equivalent to 1981 SEK.

B is a future benefit for society from the particular student studying well. In other words it is the returns of investment for society, not individual salary of the student but the taxes paid by future specialist and other profits which society gets because of the involvement of the student in society.

Throughout the game $B \geq X$ being the upper limit of the B is difficult to define because for a precise definition, a special analysis should be made in order to find the maximal benefit brought by the student who studied with excellent marks. A Precise figure is difficult to say for the case when that student in the future becomes a scientist and does some innovation and the innovation is used in practice. The profits from that for society are hard to account. However econometric analysis would help to find out the approximate upper limit of the B. For simplicity I will assume that B=2X.

In this game the first movement/step will do the Policy maker by defining the educational policy which is 'Control' or 'not Control'[6] after that the student having accepted either in '*tuition fee*' or in '*no tuition fee*' system decides whether to study well or badly. Payoffs of the players are presented in accordance with these two cases that is to say the game is divided into two parts or in two sub games. Below the strategies and related payoffs are presented.

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[6] Control is equivalent to the new approach, where there is supervision and Not Control is equivalent to the old approach, which assumed no supervision of the students' grades during their university years

4.1.2 Strategies and concerning payoffs

1. In the 'Case1' that was defined above to be 'Not Control' strategy of the policy maker the payoffs of the participants are the following:

1.1.1

If a student accepted in 'no tuition fee' studies well he gets Z, the policy maker gets –X-Z+B, as policy maker pays for the tuition fee and the monthly scholarship for the student.

1.1.2

If the student accepted in *'no tuition fee'* studies badly he gets 0 and accordingly the policy maker gets –X, because if the student has been accepted in *'no tuition fee'* system, the policy maker have to pay the tuition fee instead of the student, no matter how he or she studies.

1.2.1

If the student accepted in *'tuition fee'* system studies well he gets -0,5X and the policy maker gets -0,5X+B. In other words half of the tuition fee pays the student and the next half of the tuition fee pays the policy maker.

1.2.2

If the student accepted in *'tuition fee'* studies badly he gets –X and the policy maker gets 0.

2. In the 'Case 2' the payoffs of the participant are the following

2.1.1

If a student accepted in *'no tuition fee'* studies well he gets Z, the policy maker gets

–X-Z+B.

2.1.2

If the student accepted in *'no tuition fee'* studies badly he gets –X, which means that the student pays the tuition fee and the policy maker gets 0.

2.2.1

If student accepted in *'tuition fee'* system studies well he gets Z, that means he or she not only gets rid of the tuition fee but also receives a scholarship ,and the policy maker gets –X-Z+B.

2.2.2

If the student accepted in *'tuition fee'* studies badly he gets –X and the policy maker gets 0.

4.1.3 Normal and extensive forms of the game

Considering all the information we have it is apparent that the game discussed is a game of perfect information. The Student's strategies which are studying well or badly are freely supervised by the policy maker at the end of each academic year.

The Sequence of the game is as follows: it starts from the entrance of the policy maker who decides which type of policy to implement either 'Control' or 'Not Control'. Then Fee or no Fee types are assigned to the student. The Student has 2 strategies in each case: *'study well'* or *'not study well'*.

In the game tree the payoffs of the policy maker are represented for two cases

Game tree for the each case will look like:

Picture 4. 1 Extensive form of Case 1

Case 1 Not Control

No Fee		Fee
Study well	Study badly Study well	Study badly
(-X-Z+B, Z)	(-X, 0) (-0,5X+B, -0,5X)	(0, -X)
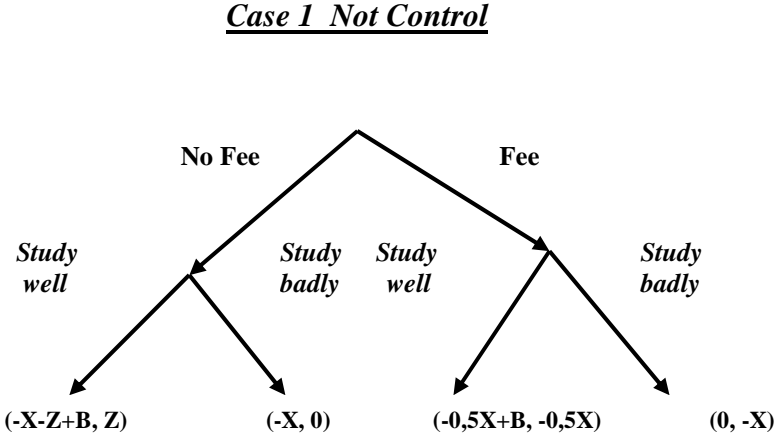
Picture 4.2 Extensive form of Case2

Case 2 Control

No Fee		Fee
Study well	Study Badly Study well	Study badly
(-X-Z+B, Z)	(0, X) (-X-Z+B, Z)	(0, -X)
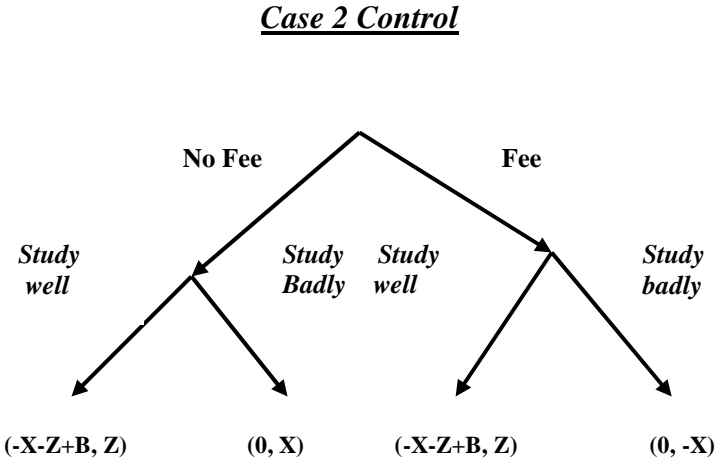
The extensive forms of these 2 sub games are presented below:

The normal form of the Case1 will be presented in Table 4.3.a, which is based on the information of Picture 4.1.

Table4.3.a Normal form of the Case 1

	SS	NN	SN	NS
No Fee	Z -X-Z+B	0 -X	Z -X-Z+B	0 -X
Fee	-0,5X -0,5X+B	-X 0	-X 0	-0,5X -0,5X+B

After the plugging the value of B=2X

Table4.3.b Normal form of the Case 1

	SS	NN	SN	NS
No Fee	Z X-Z	0 -X	Z X-Z	0 -X
Fee	-0,5X 1,5X	-X 0	-X 0	-0,5X 1,5X

The normal form of the Case2 is given in Table 4.4.a, based on the information of the Picture 4.2.

Table4.4.a Normal form of Case2

	SS	NN	SN	NS
No Fee	Z -X-Z+B	-X 0	Z -X-Z+B	-X 0
Fee	Z -X-Z+B	-X 0	-X 0	Z -X-Z+B

After the plugging the value of B=2X

Table4.4.b Normal form of Case2

	SS	NN	SN	NS
No Fee	Z X-Z	-X 0	Z X-Z	-X 0
Fee	Z X-Z	-X 0	-X 0	Z X-Z

4.1.4 Solutions of the game

After having constructed the extensive forms of these 2 sub games, it is worthy to discuss Nash equilibrium solutions of each case. Looking at the Table 4.3.b it could be found that there are 3 Nash Equilbria, which are No Fee SN, Fee SS and Fee NS.

Now looking at the Table 4.4.b it can be seen that for the Case2 the Nash Equilibriums Solutions are No fee SS, No Fee SN, Fee SS and Fee NS.

From these solutions Sub Game Perfect Nash equilibriums should be considered as the final solution of the games. For this purpose I use 'Backward induction' method. I start to analyze the game tree from the end and eliminate 'bad strategies'. Policy maker chooses either 'Control' or 'Not Control', then the students in each educational policy, accepted either in *'no tuition'* fee system or *'tuition fee'* system has two strategies either 'to study well' or 'not to study well'.

Backward induction starts from the discussion of the payoffs of the student. Hence, after filtering 'good choices' from bad choices for both players, the 'Sub game Perfect Equilibrium' for the Case1 is 'Not Control' SS and for the Case 2 it will be   Not Control SS.

Thus, having compared the payoffs of the game participants in each case, it is obvious that in each case student should study well.

To conclude the solutions of the entire game are two SPE:
The payoffs for the Case1 is (X-Z,Z) when the policy maker chooses 'Not Control' and student plays *'to study well'* accepted in the *'no tuition fee'* system and (1,5X, -0,5X) when

the policy maker plays 'Not Control' and the student accepted in a 'tuition fee' system plays 'to study well'.

The payoffs for the Case2 are (X-Z, Z) when the policy maker plays 'Control' and student accepted in a ' *no tuition fee*' system plays 'to study well' and it is (X-Z, Z) when the policy maker plays 'Control' and the student accepted in *'tuition fee'* system plays 'to study well'.
As it can be noticed from the solutions discussed above there is no Pareto preferred one. It is seen from the solution that the payoffs for the student in Case 2 are more secure as he gets Z when playing optimally in each situations irrespective of the preferable system, i. e. *'tuition fee'* system or *'no tuition fee'* system.

In the regard of the payoffs of the policy maker he gains much in Case 1, which is 'Not Control' when student is studying in a *'tuition fee'* system and he studies well. On the other hand in real life if B is large enough the policy maker will not care much about tuition fee X.

In the point of view of the student who studies well it is more preferable for him that the policy maker plays 'Control', because in this case the student gets Z and he has more incentive to study by means of money praised, to compete to other students and to be selected based according to higher intellectual abilities.

5. Data and Methodology

The data about Excellency was provided by the Ministry of Education and Science of the RA, for two academic years 2005/2006 and 2006/2007. The data is arranged according to the Universities. The provided information in the form of tables are presented in the Appendix named Table A1, A2, A3 and A4. Information is mainly divided into two parts: students studying in a 'tuition fee' system and students studying in a 'no tuition fee' system. Table A1 and table A2 provide data about the student's excellency[7], studying in the State High Educational Establishments of Republic of Armenia for the 2005-2006 academic year, second exam session. The next A3 and A4 tables provide information about 2006-2007 academic year separately for the students studying in 'no tuition fee' and 'tuition fee' systems. Recalling section 3, it is worthy to mention that during University studying the measurement grade is between 2-5 scale[8], where:

2 is equivalent to fail,

3 is equivalent to satisfactory,

4 is equivalent to good,

5 is equivalent to excellent.

Though I tried to transfer these grades into ECTS grading scale before starting to analyse I found some difficulties in the respect of preciseness of 2-5 grading scale, it does not allow to have 2,5 or 4,5 it only gives integers like 2,3,4,5.

I will use descriptive data analysing in order to

1. See the differences in grades of students studying in the 'no tuition fee' system and the 'tuition fee' system.

2. See whether the new approach conducted by the policy maker is more efficient.

Hence, for academic years 2006-2007 it is expected that the number of students who studied well[9] will be more than in the previous period. It is connected with the new policy conducted

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[7] The word Excellency is used under the meaning of students' grades, what grades they have, excluding failed exams.

[8] In the tables of appendix numerical information is replaced by the mentioned equivalents.

[9] Under the expression 'study well' it will be assumed that it means to study either with only excellent marks or with excellent and good marks. The recent requisite is also taken into account because of the case when in the class there are no students with only excellent marks, as a consequence of the competition the students with good and excellent marks will have tuition fee reductions

by the policy maker. In other words the students will be more eager to study well, as they expect reductions in their tuition fees. Recalling the Game Theoretical part of the game it is taken for granted that the rational thinker will do his or her best to study well in order to get more profit. On the other hand not all students have the same high abilities and several other factors such as life conditions, educated parents and philological characteristics. Although it is expected that in 2006-2007 academic years students would probably study well, this numbers could not serve as ideal measurements because of the cohort effect which is: when a student accepted in an old educational system (before or in 2005), who will study more than one year will continue in the same studying conditions as he or she was accepted before.

5.1 Data analysis for the period 2005-2006

In This section I will look through the data for the academic year 2005-2006.

Ministry of Education of Armenia provided the following information:

The information about newly created State University of Goris is not included in the Higher Educational Establishments of Republic of Armenia. At the beginning of the academic session there were 53 799 students. 17 662 students of which were studying without tuition fee and 36 137 students were studying with tuition fee. Academic vocation was given to 941 students. 52 792 students ought to take exams. Only 52 098 students were allowed to take exams.

How did the students study during 2005-2006 academic years?

Table 5.1.1 provides information about the students' grades.

Table 5.1.1 Information about the students' grades proportional to their number in each system.

2005-2006 academic year. The percentage of students with different marks			
	No Tuition Fee	**Tuition Fee**	**Total**
Students, who have passed the exams[10]	78.4%	64.7%	69%
Students with only excellent marks	21.5%	11.8%	15.1%
Students with 'excellent' and 'good' marks	22%	16.5%	18.5%
Students with 'satisfactory' marks	9.2%	11.4%	10.7%
Students with 'unsatisfactory' marks	18%	28.4%	25%

NOTE Students, who have passed the exams are the students without unsatisfactory marks or in other words without any fail exam. Under the row named 'students with unsatisfactory marks' it should be understood the proportion of students who have either one, two or three unsatisfactory marks. The percentage of the students with mixed marks is not included in the table, since it will not give any valuable information.

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[10] It is equivalent to say the students without any unsatisfactory grade or failed exam

Looking at the table 5.1.1 it can be easily understood that the students in the 'no tuition fee' system studied better compared to the other system. It is worth mentioning that percentage of the students in the 'no tuition fee' system with excellent marks is twice higher than in the other system The percentage of the students with excellent and good marks studying in 'no tuition fee' system is 5.5 % higher than the one in the other system.

Figure 5.1.2 represents the percentage of the students studied excellently. It is seen that nearly all Universities provided more percentage of the students with only excellent marks studying in the 'no tuition' fee system than in 'tuition fee' system. There are some exceptions such as Gavar SU and YSU Architecture and Construction, YSU Linguistic University and AS Pedagogical University, where students in the 'Tuition fee' system provided higerer percentage. On the other hand Gavar SU did not have any students studying in the 'no tuition fee' system

Figure 5.1.2 The percentage of students with only excellent marks 2005-2006 academic year
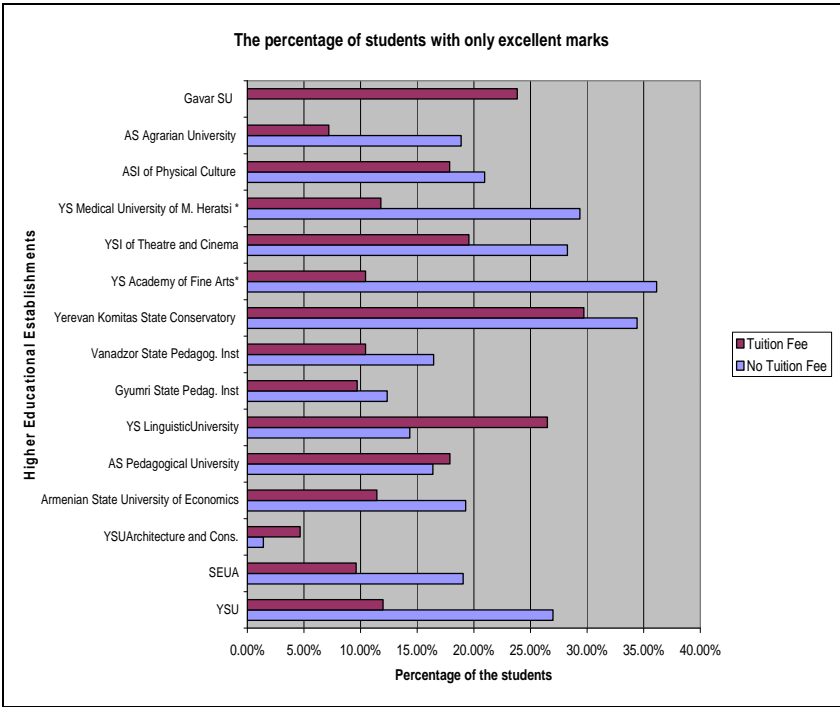
NOTE The figure is based on the following calculation: The number of students with only excellent marks/ the number of students who were allowed to take exams. The calculations are done with respect to each University.

Further from Figure 5.1.3 it could be seen that students in the 'tuition fee' system had more failed exams, than their peers in the 'no tuition fee' system.

Figure 5.1.3 The percentage of the students with fail marks
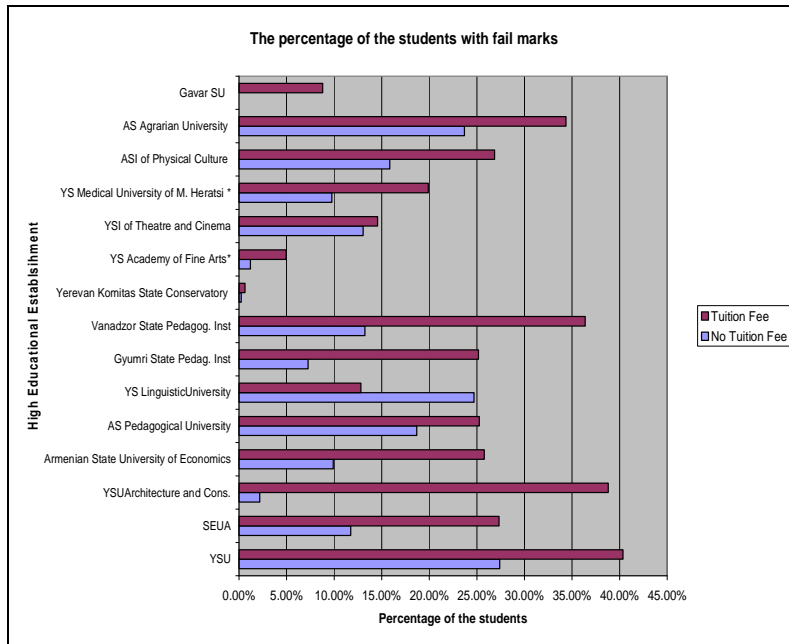
NOTE The figure is based on the following calculation: The number of students with unsatisfactory marks (they could have either one, two or three failed exams)/ the number of students who were allowed to take exams. The calculations are done with respect to each University.

Although it was very evident that the students in 'no tuition fee' system studied better, it is a little bit odd to compare the excellency of the Art University with the Economic or Medical University.

In the next subsection 2006-2007 academic years are discussed which will provide basis to compare two periods.

5.2 Data analysis for the period 2006-2007

The purpose of discussing the academic period 2006-2007 is to find out the changes between two educational policies.

Were there any changes in the percentage of the students with respect to their grades after the implementing new educational policy?

There were 51 238 students during the second academic quarter in the year 2006-2007 in the High Educational Establishments of RA, (where the number of the graduates from the State University of Armenia is not included[11]). From the number 51 238, 848 are for the students for whom there were formed academic vocation. 49 879 students had to take an exam, and only 49 508 were allowed to participate in the exams. 35 600 students passed their exams, scheduled by the academic plans, which makes the 71.4 % of the whole exam takers.

The excellence[12] of the students is high in the University of Art, precisely it is 88.1% for the Yerevan State Institute of Theatre and Cinema, 76.2% for Yerevan State Academy of Fine Arts, 71.8% for Yerevan State Conservatory and especially in its branches. Although in these High Educational Establishments also the excellence of the students in the system 'tuition fee' is lower than the students from the system 'no tuition fee'. Thus, Yerevan State Institute of Theatre and Cinema is described by the 85.1%-93.4% Excellency. Yerevan State Academy of Fine Arts is described with 70.5%-85.6%, Yerevan State Conservatory with 60.2%-90.4% Excellency.

In some Universities the excellence of the study does not reach even to 50%. For example, in 'Ijevan' branch of the Yerevan State University the excellence of studying is 40%/'no tuition fee' system 70.9 %, with tuition fee system, 25.9%/. The excellence of studying in 'Ijevan' branch of the Yerevan State University is lower by 30.8% than the avarage excellence of the Republic, the excellence of the students, studing in the system 'tuition fee' is 41.1% lower than the avarege rate of the Republic.

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[11] Note: State University of Armenia is the largest university with the largest number of students
[12] Here by saying Excellency is meant that the number/percent of the students who passed their exam and did not fail.

To conclude the grades of the students are dependent on the field they study. The above discussion shows that usually art students study better than the students in other occupations.

The total percent of students, who passed their exams, is 84.9% and 67% for the students studying free and with tuition fee respectively. These recent numbers represent the percent of the students who attended to exams and did not fail, so they could get any grades besides fail. These results show that overall, the students in the 'no tuition fee' system studied well compared with the other system.

Table 5.2.1 Information about the students' grades proportional to the students number in each system.

2006-2007 academic year. The percentage of students with different marks			
	No Tuition Fee	**Tuition Fee**	**Total**
Students who have passed the exams	84.9%	67%	72%
Students with only 'excellent' marks	25%	9.52%	14%
Students with 'excellent' and 'good' marks	27%	16%	19%
Students with satisfactory marks	5.5%	9.6%	8.4%
Students with unsatisfactory marks	13.2%,	28.2%	24%

NOTE Students, who have passed the exams are the students without unsatisfactory marks or in other words without any fail exam. Under the row named 'students with unsatisfactory marks' should be understand the proportion of students who have either one, two or three unsatisfactory marks.

From Table 5.2.1 it may be seen that that the percentage of students studying excellently[13] is bigger for the 'no tution fee' system compared with 'tution fee' students. In other words we can judge that students try to keep their place, and workaholic and clever students mostly study in the 'no tuition fee' system. Recalling subsection 5.1 and the table 5.1.1 it could be said that there is a big jump in particular cases, for instance the percantage of the students with only excelent marks is 2.6 times bigger in the 'tuition fee' system compared with the other system. As for the percantage of the students with excellent and good marks the percantage for 'no tuition fee' is 1,68 times higher than the percentage in the'tution fee' system. I have grouped each High educational isntitution taking into account its branches' result.

From Figure 5.2.2 it is seen that only in YS Academy of Fine Arts the students studying in the 'tution fee' have more friends among them studying with excelent marks than students studying in the 'no tuition fee' system. In Gavar State University the number of excelent-studying students in a 'no tuition fee' system was 0.

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[13] Here under the word excellent it is meant that student got excellent mark, in our case 'A' is equivalent to '5' for the Armenian Educational system

Figure 5.2.2 The percentege of students with only excellent marks

The percentege of students with only Excelent marks
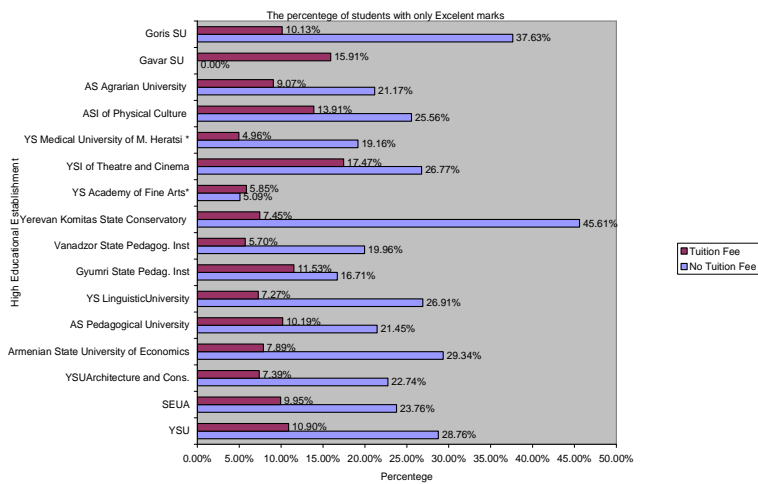
NOTE: The calculation of percentages was based on the numbers of students, who were allowed to participate in exams and the number of students, who had only excellent marks.

From Figure 5.2.3 it is obvious that the students in the 'tuition fee' system had a great percentage of fail marks. Conversely the students from the 'no tuition fee' system studied well. We can say that educational standards, entrance exams filter clever students from not so 'clever' students but again this filtration for one time is not enough to conclude that chosen students will study very well. The total percentages of the failed students from the 'no tuition fee' and from the system 'tuition fee' are 13.20% and 28.24% accordingly.

There is a dilemma if policy maker has chosen these students to finance their studying as prospective specialists why have they failed their exams?

Figure 5.2.3 The percantage of the students who failed.

The percentage of students who failed
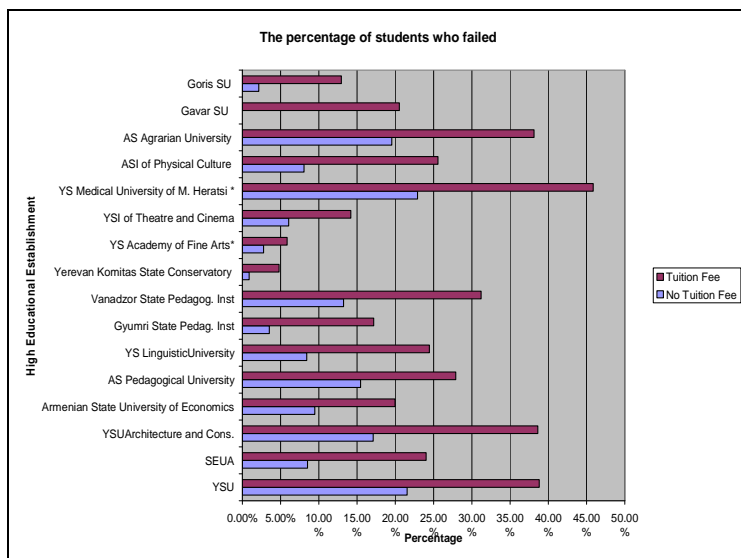
Note: The diagram was constructed based on the numbers of students who were allowed to participate in exams and the numbers of students, who failed their exam included the students number who have one failed, two failed and three failed exams.

Figure 5.2.4 shows students mean scaled grades: Mean scaled grade = (Number of students got5*5+Number of students got 4*4 + Number of students got 3*3)/ total number of the students who took the exams.

Figure 5.2.4 The students mean scaled grades without failed marks
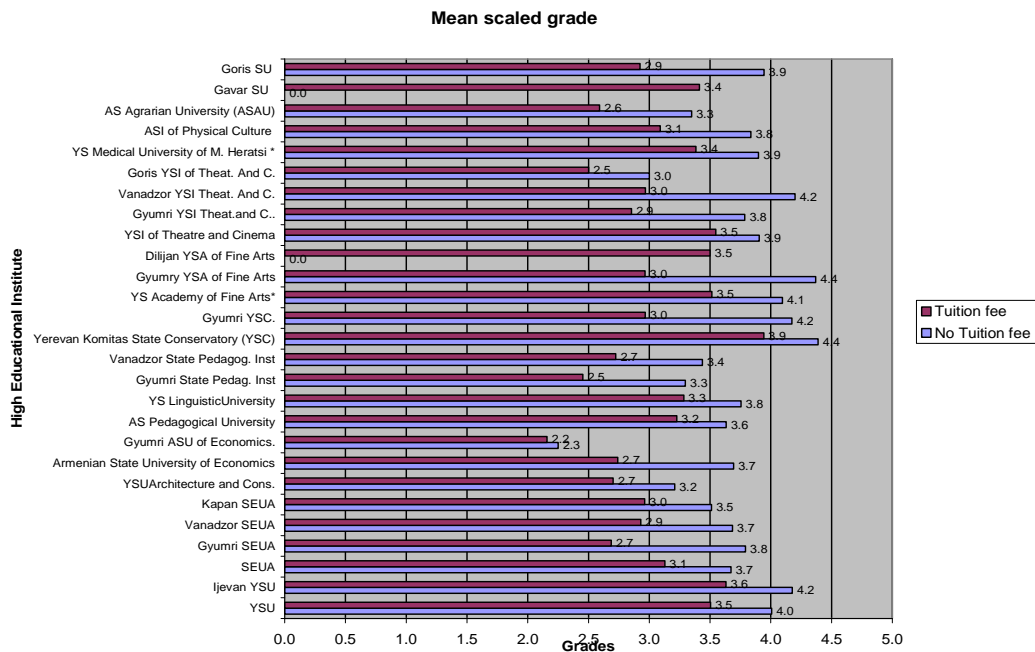
As for the study disciplines, from Table A2 and TableA3 it is seen that the number of students who were absent without any considerable reason was high for the students studying in the 'tuition fee' system, precisely it was 1 342 from 35 238 students or 3,8%. and only 1% for the students studying in a 'no tuition fee' system. From these figures it is hard to conclude whether the students from the 'tuition fee' system were not present because of low abilities to study or because of financial difficulties.

To conclude, it is obvious that the students in 'no tuition fee' system studied better compared to the other system as they have higher mean scaled grades.

So far we have discussed the data of two academic years that is 2005/2006 and 2006/2007 separately. The table below is combing information about the students grades for two academic years with respect to 'no tuition' and 'tuition fee' systems.

Table 5.2.5 Summarized information given in percentages

The percentage of the students with respect to their marks during 2005-2006 and 2006-2007 academic years.	2005-2006			2006-2007		
	'no'	tuit	total	'no'	tuit	total
The % of the students who passed their exams	78.4	64.7	**69**	84.9	67	**72**
The % of the students studying with excellent and good marks	22.2	16.5	**18.5**	27	16	**19**
The % of the students studying with only excellent marks	21.7	11.8	**15.1**	25	9.5	**14**
The % of the students who have failed one exam	11.4	17.6	**15.5**	7.8	16	**13.8**
The % of the students who have failed two exams	5.4	8.6	**7.5**	3.9	9	**7.5**
The % of the students who have failed three exams	1.2	2.2	**1.9**	1.4	3.1	**2.6**
Total number of the students allowed to take exams	17389	34709		14270	35238	

Note: The % of the students studying with excellent marks was calculated as the number of students with excellent grades in the 'no tuition fee' or tuition fee system divided by the total number of students studying in the 'no tuition fee' system or tuition fee system, who were allowed to take academic current exams, and then multiplied by 100.

Judging from the figures of Table 5.2.5, the students in the 'no tuition fee' system were studying better in the 2006/2007 than in the academic year 2005/2006. Namely the percentage of the students with excellent marks was 21.7% in the year 2005/2006 and was 25 % in the year 2006/2007. The percentage of the students in the 'no tuition fee' system with the excellent and good marks was 4.08 % higher in the 2006/2007 year comparing with 2005/2006.

The percentage of students in the 'no tuition fee' system with only one failed exam is less in the year 2006/2007 year by 3.6% than in the year 2005/2006. Only the percentage of students with 3 failed exam slightly differs, more precisely 0,20 percentage is higher in the year 2006/2007 than in the previous period.

Thus, the results are compatible with the thought earlier made in this work, that new educational policy is more efficient, as it was seen that the percentage of students with excellent marks increased and the numbers of students with failed marks decreased. The new rules in the higher educational establishments induce students to study hard.

Recalling the 'Related literatures' part of the work where the model suggested by Michael Rothschild's & Lawrence J. White's (1995) was discussed, as the good method to struggle against 3rd limitation[14] in the point of view universities or policy maker is the supervision of the current grades of the students.

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[14] 3) limitation of the model is: Although in the model it was assumed that universities were fully informed about students types and students were informed about universities types, in real life information asymmetries in the education field are faced

6. Conclusions

To sum up it is efficient for policy maker and students to control education process in the higher education. The supervision allows policy makers to finance clever students, to create equal opportunities for students. Students in their turn compete with their peers try to be the best and get rid of tuition fees.

The supervision is the most powerful tool against the adverse selection. It gives an additional opportunity to principal, or policy maker to reconsider and review the decision made earlier, that is if chosen students, who can not satisfy the appropriate academic standards during their academic years would be replaced by the new students who are more eligible for studying without tuition fee.

In the framework of game theory again it is mutually profitable to study well. As for real life example, Armenian higher education reforms showed that it is really better strategy for university or supervision body to be consistent in investigating students' studying process. Comparing two periods it was seen that in new period that is 2006/2007 academic year, when policy maker is supervising the students' grades, the students who were studying in 'no tuition fee' system tried to keep their places more consistently than in the previous period. As for failed exams again the result is improved, that is the students studying in the 'no tuition fee' in the period 2006/2007 with failed exams are less than in the previous academic period.

Recalling the questions, discussed at the beginning of the work, which are
1. How to find this balanced high educational system which is desirable almost for all members of society?
 2. How to know if the Educational system is efficient for policy maker and student?
It can be said that Third degree price discrimination is quite strong mean to reach to the desirable high educational system, considering of course that the educational standard are competitive with the modern educational standards. It is known that there is a sequential link between policy maker[15]-student- employer and than employer-employee-state , so as an answer for 1st question I would say that when there is an efficiently organized education field other things equal, all members of society will get benefits from it. To answer second question I would use production scene: If policy maker is a company manager who wants to undertake efficient production process, he should have qualified

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[15] State

inputs. These qualified inputs in these particular case clever students will work with higher productivity because they are rewarded with extra money. Any economical strategy is justified for the rational economic agent when the costs do not exit the profit. The educational system is efficient for policy maker and student when policy maker and student get benefits from returns to schooling of the student.

To sum up, although there are some shortcomings in Higher educational establishments, i. e. corruption, not sufficient funding of Universities, slow creation of new University-industry connection, low funding of research works, the country is trying to adjust the educational system to the New World economic conditions and allocate local resources effectively.

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Table A.1Information about the students studying without tuition fee

Data for 2005/2006 academic year --------2-nd---------------- exam session

/spring and winter /

---------------------- ,   ------------------------------- ,   ----without tuition fee---------- ,   -----1-5/6/---------

/according to HES/   /without tuition fee/   /the year of studying/

HES /the faculty/	the beginning of exam / the session	students in the academic vocation	/column4=column2-column3/	students, allowed to take exams	Have appeared ful re	not ect ful	Took the exams all su /column8=column9+column10+column11.+column12/	'E xc	nt' an	xe d	'S uff	Have failed Total /column13=column14+column15.+column16/	fai	fai le	le d	Excellence/column17=column8/column4*100	the course of theoretical	repeat	because of marks	Have passed to the next year Total	e nu
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
YSU	3277	13	3264	3257	95	70	2293	880	741	534	138	869	442	318	109	70.3%					
Ijevan YSU	416	6	410	410	0	0	274	110	77	65	22	136	79	32	25	66.8%					
SEUA	2138	17	2121	2117	1	0	1827	420	452	833	122	269	173	78	18	86.1%					
Gyumri SEUA	250	1	249	249	0	0	233	50	56	112	15	16	9	7	0	93.6%					
Vanadzor SEUA	224	0	224	224	0	0	195	34	62	92	7	29	13	16	0	87.1%					
Kapan SEUA	128	0	128	128	0	0	123	14	37	67	5	5	4	1	0	96.1%					
YSUArchitecture andCons.	739	2	737	737	0	0	577	104	89	251	133	160	90	59	11	78.3%					
AsU of Economics	1510	0	1510	1510	0	8	1272	446	362	379	85	230	136	94	0	84.2%					
Gyumri ASU of Economics.	92	0	92	92	5	6	72	19	15	17	21	9	9	0	0	78.3%					
AS Pedag. University	1605	0	1605	1568	37	49	1226	257	324	504	141	293	195	75	23	76.4%					
YSLinguisticUniversity	2265	6	2259	2154	148	66	1579	309	512	372	386	532	406	104	22	69.9%					
Gyumri State Pedag. Inst	826	0	826	826	95	0	671	102	147	282	140	60	46	12	2	81.2%					
Vanadzor State Pedag. Instit	621	0	621	620	5	49	485	102	106	195	82	82	68	14	0	78.1%					
(YSC)	412	3	409	408	3	24	380	196	143	35	6	1	1	0	0	92.9%					
Gyumri YSC.	22	0	22	22	0	0	22	4	5	2	11	0	0	0	0	100%					
YS Academy of Fine Arts*	243*	0	226	226	15	9	199	61	81	52	5	3	3	0	0	88.1%					
Gyumry YSA of Fine Arts	23	0	23	23	0	1	22	9	9	3	1	0	0	0	0	95.7%					
Dilijan YSA of Fine Arts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%					

HES	198	0	198	198	0	1	171	62	51	40	18	26	22	4	0	86.4%				
YSI of Theatre and Cinema	198	0	198	198	0	1	171	62	51	40	18	26	22	4	0	86.4%				
Gyumri YSI of theatre and C.	20	0	20	20	0	0	16	2	11	1	2	4	3	1	0	80.0%				
Vanadzor YSI of Theatre and C.	10	0	10	10	0	0	10	1	5	4	0	0	0	0	0	100%				
Goris YSI of Theatre and C.	2	0	2	2	0	0	2	0	1	0	1	0	0	0	0	100%				
YS Medical *	1075**	6	1035	1035	102	46	786	304	251	101	130	101	61	40	0	75.9%				
ASI of Physical Culture	570	1	569	568	0	0	478	119	149	192	18	90	68	20	2	84.0%				
(ASAU)	996	9	987	985	18	40	715	169	183	247	116	212	151	59	2	72.4%				
Gavar SU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%				
Total	17662	64	17547	17389	524	369	13628	3774	3869	4380	1605	3127	1979	934	214	77.7%				

* - notations with this sign include the number of students writing master thesis in their 6th year

Table A.2Information about the students studying with tuition fee

Data for 2005/2006 academic year --------2-nd---------------- exam session

/spring and winter /

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　　　　　　　　　　　　　　/according to HES/　　　　　　　　　　/with tuition fee/　　　/the year of studying

HES /the faculty/	The number of the students at the beginning of the exam session	students in the academic vocation	Ought to take the exams /column4=column2-column3/	Total number of students, allowed to take exams	Have not appeared		Took the exams /column8=column9+column10+column11.+column12/					Have failed /column13=column14+column15.+column16/				Absolute Excellence/column17=column8/column4*100%/	Have finished the course of theoretical teaching	Were left to repeat the course Respectful reason	because of marks for passing next year	Have passed to the next year	
					Respectful reason	Disrespectful reason	From all subjects	Only with 'Excelent' marks	'Excelent' and 'Good'	With mixed marks	Only with 'Sufficent' marks.	Total	failed exam	Two failed exam	Three failed exam					From all subjects	Only with 'Excelent' marks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
YSU	6930	11	6919	6871	425	260	3876	866	1375	1273	362	2570	1504	821	245	56.0%					
Ijevan YSU	788	26	762	762	0	0	252	49	66	85	52	510	162	119	229	33.1%					

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SEUA	4393	480	3913	3900	11	0	2828	410	536	1405	477	1081	646	330	105	72.3%				
Gyumri SEUA	515	23	492	492	5	0	351	32	62	187	70	136	69	62	5	71.3%				
Vanadzor SEUA	361	20	341	341	1	0	223	23	38	132	30	117	41	72	4	65.4%				
Kapan SEUA	265	21	244	244	1	0	217	13	42	139	23	26	22	2	2	88.9%				
YSUArchitecture and Cons.	1158	1	1157	1157	0	0	698	54	67	339	238	449	252	165	32	60.3%				
Armenian State University of Economics	3325	0	3325	3325	0	78	2352	372	568	1027	385	895	450	433	12	70.7%				
Gyumri ASU of Economics.	263	0	263	259	8	16	196	22	38	59	77	39	35	4	0	74.5%				
AS Pedagogical University	4845	0	4845	4511	334	382	2990	461	807	1280	442	1139	779	275	85	61.7%				
YS LinguisticUniversity	905	5	900	898	46	17	739	272	238	157	72	115	83	25	7	82.1%				
Gyumri State Pedag. Inst	1891	4	1887	1887	377	0	1036	105	183	424	324	475	383	86	6	54.9%				
Vanadzor State Pedagog. Inst	1714	0	1714	1696	21	177	899	126	177	387	209	617	464	142	11	52.5%				
(YSC)	712	1	711	710	6	114	589	250	216	81	42	2	2	0	0	82.8%				
Gyumri YSC.	87	0	87	84	0	0	74	14	20	19	21	3	3	0	0	85.1%				
YS Academy of Fine Arts*	407*	0	392	392	65	49	259	31	87	126	15	19	12	7	0	66.1%				
Gyumry YSA of Fine Arts	126	0	126	125	0	6	112	25	33	45	9	8	5	2	1	88.9%				
Dilijan YSA of Fine Arts	29	0	29	29	0	0	29	1	8	19	1	0	0	0	0	100%				
YSI of Theatre and Cinema	323	0	323	323	1	13	257	65	94	77	21	52	48	4	0	79.6%				
Gyumri YSI Theat.and C..	52	0	52	52	0	0	43	5	11	9	18	9	5	4	0	82.7%				
Vanadzor YSI Theat. And C.	30	0	30	30	0	2	28	7	7	12	2	0	0	0	0	93.3%				
Goris YSI of Theat. And C.	14	0	14	14	0	0	14	5	3	2	4	0	0	0	0	100%				
YS Medical University *	1602	24	1578	1578	121	161	982	186	339	171	286	314	234	80	0	62.2%				
ASI of Physical Culture	963	5	958	957	0	0	700	171	115	277	137	257	189	58	10	73.1%				
AS Agrarian University (ASAU)	2891	256	2635	2616	41	180	1496	188	270	584	454	899	625	259	15	56.8%				
Gavar SU	1548	0	1548	1456	20	90	1218	347	349	340	182	128	87	41	0	78.7%				
Total	36137	877	35245	34709	1483	1545	22458	4100	5749	8656	3953	9860	6100	2991	769	63.7%				

Table A.3 Information about the students studying without tuition fee

Data for 2006/2007 academic year --------2-nd---------------- exam session

/spring and winter /

---------------------- ,   ------------------------------- ,   ----without tuition fee---------- ,   -----1-5/6/---------

                                      /according to HES/   /without tuition fee/   /the year of studying/

HES /the faculty/	The number of the students at the beginning of the exam session	Where the number of students in the academic vocation	Ought to take the exams /column4=column2-column3/	Total number of students, allowed to take exams	Have not appeared		Took the exams /column8=column9+column10+column11.+column12/					Have failed /column13=column14+column15.+column16/				Absolute Excellence/column17=column8/column4*100%/	Have finished the course of theoretical teaching	Were left to repeat the course	Were weadrawed because of marks for passing next year	Have passed to the next year	
					Respectful reason	Disrespectful reason	From all subjects	Only with 'Excellent' marks	Only with 'Excellent' and 'Good' marks	With mixed marks	Only with 'Sufficent' marks.	Total	Only one failed exam	Two failed exams	Three failed exams					Total	Where the numbers pg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
YSU	2322	1	2321	2319	20	34	1824	679	664	419	62	475	228	163	84	78.6					
Ijevan YSU	327	0	327	327	0	0	232	82	112	37	1	95	45	20	30	70.9					
SEUA	2026	14	2012	2012	1	0	1833	514	415	834	70	178	121	40	17	91.1					
Gyumri SEUA	246	3	243	243	0	0	225	54	91	73	7	18	12	6	0	92.6					
Vanadzor SEUA	204	0	204	204	0	0	184	29	98	47	10	20	8	9	3	90.2					
Kapan SEUA	126	1	125	125	0	0	121	17	52	44	8	4	3	1	0	96.8					
YSU of Architecture and Cons	620	0	620	620	0	0	514	141	129	143	101	106	61	31	14	82.9					
ASU of Economics	1211	1	1210	1210	0	4	1094	364	310	327	93	112	70	39	3	90.4					
Gyumri ASU of Economics.	68	0	68	68	4	2	52	11	2	18	21	9	5	4	0	76.5					
AS Pedagogical University	1585	0	1585	1585	13	27	1300	340	341	553	66	245	139	74	32	82.0					
YS LinguisticUniversity	905	2	903	903	25	2	802	243	177	363	19	76	45	23	8	88.8					
Gyumri State Pedag.	826	0	826	826	65	0	732	138	226	273	95	29	26	3	0	88.6					
Vanadzor State Pedag.	446	0	446	446	0	10	377	89	101	149	38	59	42	16	1	84.5					
Yerevan Komitas State	344	2	342	342	5	25	309	156	126	24	3	3	2	1	0	90.4					

Conservatory (YSC)																			
Gyumri YSC.	23	0	23	23	0	0	23	8	14	0	1	0	0	0	0	100			
YS Academy of Fine Arts*	240	0	194	194	13	9	166	62	58	46	0	6	3	3	0	85.6			
Gyumry YSAof Fine Arts	22	0	22	22	0	0	19	11	4	4	0	0	0	0	0	86.4			
Dilijan YSA of Fine Arts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
YSIof Theatre and Cinema	168	0	168	168	0	1	157	50	60	41	6	10	10	0	0	93.4			
Gyumri YSI of theatre and C.	16	0	16	16	0	0	14	0	11	3	0	2	1	1	0	87.5			
Vanadzor YSI of Theatre and C	11	0	11	11	0	1	10	3	6	1	0	0	0	0	0	90.9			
Goris YSI of Theatre and C	3	0	3	3	0	1	2	0	0	2	0	0	0	0	0	66.7			
YSMedical University *	1031	0	856	856	13	0	647	164	292	178	13	196	116	71	9	75.6			
ASI of Physical Culture	583	0	583	583	1	0	535	149	236	121	29	47	40	5	2	91.8			
ASAgrarian University (ASAU)	987	15	972	978	3	24	760	207	229	198	126	191	141	49	1	78.2			
Gavar SU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Goris SU	187	1	186	186	0	4	178	70	58	40	10	4	3	0	1	95.7			
Total	14527	40	14266	14270	163	144	12110	3581	3812	3938	779	1885	1121	559	205	84.9			

* - notations with this sign include the number of students writing master thesis in their 6th year

Table A.4 Information about the students studying with tuition fee

Data for 2006/2007 academic year --------2-nd---------------- exam session

/spring and winter /

---------------------- , ------------------------------ , ----with tuition fee---------- , -----1-5/6/---------
/according to HES/ /with tuition fee/ /the year of studying

HES /the faculty/	The number of the students at the beginning of the exam session	Where the number of students in the academic vocation	Ought to take the exams /column4=column2−column3/	Total number of students, allowed to take exams	Have not appeared		Took the exams /column8=column9+column10+column11.+column12/					Have failed /column13=column14+column15.+column16/				Absolute Excellence/column17=column8/column4*100%/	Have finished the course of theoretical teaching	Were left to repeat the course Respectful reason	Were weardrawed because of marks for passing next year Disrespectful reason	Have passed to the next year	
					Respectful reason	Disrespectful reason	From all subjects	Only with 'Excelent' marks	Only with 'Excelent' and 'Good' marks	With mixed marks	Only with 'Sufficent' marks.	Total	One failed exam	Two failed exam	Three failed exam					From all subjects	Only with 'Excelent' marks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
YSU	5501	4	5497	5476	110	256	3480	637	1226	1368	249	1886	1030	642	214	63.3					
Ijevan YSU	693	14	679	679	17	0	176	34	64	71	7	503	104	90	309	25.9					
SEUA	4105	302	3803	3788	17	0	2853	396	497	1653	307	928	552	241	135	75.0					
Gyumri SEUA	514	27	487	487	0	0	374	47	62	174	91	113	60	51	2	76.8					
Vanadzor SEUA	340	21	319	319	0	0	215	22	49	108	36	104	46	55	3	67.4					
Kapan SEUA	287	26	261	260	0	0	239	18	45	146	30	21	14	7	0	91.6					
YSU Architecture and Cons.	1044	7	1037	1028	2	7	631	76	122	279	154	397	211	127	59	60.8					
ASU of Economics	2918	5	2913	2913	0	43	2281	226	463	1090	502	589	326	252	11	78.3					

Gyumri ASU of Economics.	239	0	239	229	7	13	171	22	22	57	70	38	29	7	2	71.5
AS Pedagogical University	5618	0	5618	5359	259	430	3434	546	763	1765	360	1495	856	439	200	61.1
YS LinguisticUniversity	2748	13	2735	2711	85	32	1987	197	355	1374	61	663	367	253	43	72.7
Gyumri State Pedag. Inst	2125	0	2125	2125	420	0	1340	164	217	533	426	365	308	53	4	63.1
Vanadzor State Pedag. Inst	1525	0	1525	1525	1	79	969	81	197	482	209	476	327	143	6	63.5
Yerevan Komitas State Conservatory (YSC)	554	6	548	531	3	181	330	76	159	95	0	17	16	1	0	60.2
Gyumri YSC.	75	2	73	73	1	0	60	11	18	17	14	12	10	2	0	82.2
YS Academy of Fine Arts*	430	0	369	369	60	34	260	31	84	141	4	15	12	3	0	70.5
Gyumry YSA of Fine Arts	152	0	152	150	0	2	115	10	42	41	22	17	16	1	0	75.7
Dilijan YSA of Fine Arts	34	0	28	28	0	0	28	4	6	18	0	0	0	0	0	100
YSI of Theatre and Cinema	296	0	296	296	0	6	252	61	55	123	13	38	32	3	3	85.1
Gyumri YSI Theat.and C..	52	0	52	52	0	0	34	2	9	17	6	18	15	2	1	65.4
Vanadzor YSI Theat. And C.	31	0	31	31	0	0	31	4	6	16	5	0	0	0	0	100
Goris YSI of Theat. And C.	16	0	16	16	0	0	16	2	3	6	5	0	0	0	0	100
YS Medical University	1721	7	1491	1491	18	0	789	74	287	384	44	684	358	269	57	52.9
ASI of Physical Culture	1021	0	1021	1021	1	0	759	142	151	344	122	261	167	71	23	74.3
AS Agrarian University (ASAU)	3002	341	2661	2667	10	127	1513	242	352	434	485	1017	629	387	1	56.9
Gavar SU	1173	0	1173	1150	33	85	796	183	235	287	91	236	163	56	17	67.9
Goris SU	497	33	464	464	0	47	357	47	98	139	73	60	35	20	5	76.9
Total	36711	808	35613	35238	1044	1342	23490	3355	5587	11162	3386	9953	5683	3175	1095	67.0